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PATENT COOPERATION TREAT

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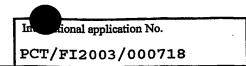
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BP107666	FOR FURTHER ACTION	ON See Form	PCT/IPEA/416	
International application No.	International filing date (d	ay/month/year)	Priority date (day/month/year)	
PCT/FI2003/000718	02-10-2003		02-10-2002	
International Patent Classification (IPC) o		IPC		
H04Q 7/38, H04L 12/56	, H04Q 7/22		·	
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Applicant				
Nokia Corporation et	al.	••		
This report is the international pre Authority under Article 35 and tr			is International Preliminary Examining	
2. This REPORT consists of a total	·	including this cove	· .	
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		-	11. sheets, as follows: we been amended and are the basis of this report	
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4. This report contains indications r	elating to the following iten	ns: ·		
Box No. I Basis o	of the report			
Box No. II Priority				
Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability				
Box No. IV Lack o	f unity of invention			
Box No. V Reason	ned statement under Article	35(2) with regard	to novelty, inventive step or industrial	
	ability; citations and explana a documents cited	ations supporting s	uch statement	
Box No. VII Certain defects in the international application				
Box No. VII Certain observations on the international application				
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Date of submission of the demand		Date of completion	n of this report	
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Box	No. I	Basis of the report	
1.		regard to the language, this report is based on the international application in the language in which it was filed, un vise indicated under this item.	ıless
		This report is based on a translation from the original language into the following language which is the language of a translation furnished for the purposes of:	
		international search (under Rules 12.3 and 23.1(b))	l
		publication of the international application (under Rule 12.4)	1
		international preliminary examination (under Rules 55.2 and/or 55.3)	
2.	furnish	regard to the elements of the international application, this report is based on (replacement sheets which have the hed to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally five not annexed to this report):	
		the international application as originally filed/furnished	l
	\boxtimes	the description:	
		pages 1-4, 8-15 as originally filed/furnishe	ź
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		a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.	
3.		The amendments have resulted in the cancellation of:	ì
		the description, pages	
		the claims, Nos.	ļ
		the drawings, sheets/figs	
		the sequence listing (specify):	
		any table(s) related to the sequence listing (specify):	
4.		This report has been established as if (some of) the amendments annexed to this report and listed below had not made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box 70.2(c)).	: been (Rule
		the description, pages	
		the claims, Nos.	
		the drawings, sheets/figs	
		the sequence listing (specify):	
		any table(s) related to the sequence listing (specify):	
	If iter	m 4 applies, some or all of those sheets may be marked "superseded."	

Form PCT/IPEA/409 (Box No. I) (January 2004)

INTERNATIONAL PREAMINARY REPORT ON PATENTABILITY

Ational application No.
PCT/FI2003/000718

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement			
		•	
N)	Claims Claims	1-54	YES NO
step (IS)	Claims Claims	1-54	YES NO
applicability (IA)	Claims Claims	1-54	YES NO
1		N) Claims Claims Step (IS) Claims Claims Claims Claims Claims	N) Claims 1-54 Claims Step (IS) Claims 1-54 Claims Lapplicability (IA) Claims 1-54

2. Citations and explanations (Rule 70.7)

The invention concerns a method for indicating one or more requirements for point-to-multipoint MBMS (Multimedia Broadcast/Multicast Service) service reception in a wireless system. The object of the invention is to reduce the power consumption and avoid most error cases, in a MBMS wireless system, by communicating service requirements and capability notifications between the wireless terminals and the wireless system.

Reference is made to the following documents:

D1: WO 0126409, A1

D2: WO 9826625, A2

D3: US 2002071480, A1

D4: US 2001010685, A1

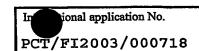
D5: 3GPP TS 22.146 V6.0.0 (2002-06), Technical specification, 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Multimedia Broadcast/Multicast Service; Stage 1 (release 6).

D6: WO 0152583, A1

Document D1 is considered to represent the closest prior art. D1 relates to a method of broadcasting service capabilities in a cellular telecommunications network. The network broadcasts handover requirements messages to the user equipment with a bitmap indicating the radio access technology types generations for which the base station requires the user equipment unit make handover to measurements, measurements and reports. Based on the capability message the user equipment unit determines which of the services available in the cell the mobile equipment unit supports and prefers to use (Abstract; page 9, line 7-page 14, line 27; and claims 1-17).

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient. Continuation of: Box V

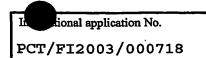
D1 relates generally to broadcasting of service capabilities in a cellular network. The capability message just informs the terminals about the services (in this case by "services" basically referring to plain network parameters, that possibly varying and diverse capabilities of the base station/network itself) supported by the system within that particular cell in order to let the mobile terminal(s) properly register with the network (page 14, rows 3, 19) by utilising a suitable technique, if any, during the activation phase of the terminal(s) (page 12, row 31).

Therefore, the services as such are not unequivocally defined or special characteristic thereof addressed in relation to the mobile terminal's capabilities.

In the present invention the terminals/network shall determine based on the received, unambiguous information whether they/the terminals are capable or incapable to receive related service data to avoid unnecessary transmission/reception attempts.

Thus the invention according to amended claims 1-54 is novel, is considered to involve an inventive step. It is considered to be industrial applicable.

INTERNATIONAL PREDMINARY REPORT ON PATENTABILITY



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Certain ;	published docume	ents (Rule 70	0.10)		
•	Application No. Patent No.		Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
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terminal is capable of receiving data on two time slots 302. If, for example, in GERAN the media stream is sent on three adjacent time slots per carrier 304, two time slot capable terminals just cannot receive the service 306. Also, if higher data rate is to be provided by using 8 PSK modulation, only the terminals that support EDGE can receive the service. As a consequence, there exists a great demand for defining and notifying about what kind of requirements the terminals must meet in order to be able to receive a particular MBMS service. The same situation applies to UTRAN with terminals providing varying support for bit-rate adaptation and other properties.

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An object of the present invention is to provide a feasible and reliable technique for indicating requirements for broadcast and multicast service reception. The object is achieved with a method and a device which either explicitly or implicitly provide that information to a receiving end a priori, before actual attempts by the receiving end to receive overly demanding or otherwise incompatible transmission. Thereby, most error cases can be avoided and average power consumption reduced, as the terminal does not need to monitor the broadcast blocks it cannot receive.

A method according to the invention for indicating one or more requirements for point-to-multipoint MBMS service reception in a wireless system is characterized in that in that said method comprises the step of transmitting a broadcast or multicast message indicating said requirements over the air interface to at least one terminal within the service range in order to allow the terminal to determine whether it is capable of receiving the service or not, said requirements being indicated in relation to at least one of the following: time slot configuration, modulation type, bit rate, capability class.

In another aspect of the invention, a method for indicating requirements for point-to-multipoint service reception in a wireless system to be performed by a terminal operable in said system, is characterized in that said method comprises the step informing terminal's capabilities to said system in order to enable the system to deduce on the basis of informed data whether the terminal is capable of receiving the service or not.

In a further aspect of the invention, a terminal operable in a wireless system, comprising processing means and memory means for processing and storing instructions and data, is characterized in that said terminal is arranged to receive a message indicating requirements for point-to-multipoint service reception and



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arranged to determine on the basis of said requirements whether it is capable of receiving the service or not.

In a further aspect of the invention, a terminal operable in a wireless system, comprising processing means and memory means for processing and storing instructions and data, is characterized in that it is arranged to inform its capabilities to said system for the examination of fulfilment of point-to-multipoint service reception requirements.

In a further aspect of the invention, a network element operable in a wireless system, comprising processing means and memory means for processing and storing instructions and data, is characterized in that it is arranged to send a message indicating requirements for point-to-multipoint service reception to be delivered to at least one wireless terminal within the service range in order to allow said wireless terminal to determine whether it is capable of receiving the service or not.

In a further aspect of the invention, a network element operable in a wireless system, comprising processing means and memory means for processing and storing instructions and data, is characterized in that it is arranged to receive a notification from a terminal and deduce on the basis of said notification whether the terminal is capable of receiving a point-to-multipoint service or not.

A system according to the invention comprises a network element and at least one wireless terminal operable in said system, and the system is characterized in that said network element comprises means for sending a message indicating requirements for point-to-multipoint service reception to be delivered to at least said wireless terminal within the service range and said terminal comprises means for receiving said broadcast message indicating requirements for point-to-multipoint service reception and means for determining on the basis of said indication whether it is capable of receiving the service or not.

In one embodiment of the invention a system already comprising CBS (Cell Broadcast Service) is supposed to support more versatile MBMS services as well and notify terminals in-range about the requirements for service reception in conjunction with sending a CBS schedule message disclosing data about MBMS services instead. In practise, the requirements are notified by informing the terminals about an applicable MBMS capability class. Three different capability classes define the minimum capabilities required for receiving available services.



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In another embodiment of the invention a mobile terminal capable of receiving point-to-multipoint services informs the system it is connected to about its capabilities such as a maximum number of concurrently receivable downlink time slots for joining a certain MBMS multicast service. The system checks if necessary minimum requirements for the joining/service reception are met and if that is the case, accepts the joining request and if not, rejects it.

The accompanying dependent claims describe some embodiments of the invention.

- 10 In the following, the invention is described in more detail by reference to the attached drawings, wherein
 - Fig. 1 is a block diagram of a MBMS capable system as referred to in the description of the background of the invention.
- Fig. 2 depicts provision of MBMS broadcast and multicast services as presented in the reference [2].
 - Fig. 3 depicts a scenario, wherein a mobile terminal supports monitoring of two time slots per frame and thus is not capable of receiving a service requiring three time slots.
- Fig. 4 is a signalling chart disclosing one option for MBMS Broadcast service activation and requirements indication as proposed in a first embodiment of the invention.
 - Fig. 5 is an example of an indication request message disclosed in figure 4
 - Fig. 6 illustrates one possible MBMS capability class division according to the first embodiment of the invention.
 - Fig. 7 illustrates a CBS schedule message in accordance with the first embodiment of the invention.
 - Fig. 8A is a flow diagram disclosing the first embodiment of the invention
 - Fig. 8B is a flow diagram disclosing a second embodiment of the invention
- Fig. 9A is a block diagram of a wireless terminal, substantially a cellular phone, capable of sending and receiving broadcast/multicast data according to the invention.
 - Fig. 9B is a block diagram of a network element capable of sending and receiving broadcast/multicast data according to the invention.

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Claims

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- 1. A method for indicating one or more requirements for point-to-multipoint MBMS (Multimedia Broadcast/Multicast Service) service reception in a wireless system, characterized in that said method comprises the step of
- -transmitting a broadcast or multicast message indicating said requirements over the air interface to at least one terminal within the service range in order to allow the terminal to determine whether it is capable of receiving the service or not (822), said requirements being indicated in relation to at least one of the following: time slot configuration, modulation type, bit rate, capability class.
 - 2. A method of claim 1, characterized in that a decision of whether to receive the service or not is made in the terminal on the basis of said indication.
 - 3. A method of claim 1-2, characterized in that it further comprises a step wherein said requirements for receiving the service are defined (820).
- 4. A method of claim 1-2, **characterized** in that it further comprises a step wherein the service-related data is transmitted in conformity with indicated requirements (824).
 - 5. A method of claim 1-2, characterized in that said requirements are indicated in said message implicitly with an identifier associated to a certain set of requirements.
 - 6. A method of claim 1-2, characterized in that said requirements are indicated in said message explicitly with parameters.
 - 7. A method of claim 1-6, characterized in that said system is substantially GSM (Global System for Mobile communication)/GPRS (General Packet Radio Service) or UMTS (Universal Mobile Telecommunications System) system.
 - 8. A method of claim 1-7, characterized in that said message is transmitted to the terminals over radio access network.
 - 9. A method of claim 8, characterized in that said radio access network is GERAN (GSM/EDGE Radio Access Network) or UTRAN (UMTS Terrestrial Radio Access Network).



- 10. A method of claim 1-8, characterized in that said message is originated by a network element.
- 11. A method of claim 1-10, characterized in that said message is sent by the CBC (Cell Broadcast Centre) or RNC/BSC (Radio Network Controller/BaseStation
 5 Controller).
 - 12. A method of claim 1-8, characterized in that said message is substantially a schedule message.
 - 13. A method of claim 12, characterized in that said schedule message is CBS (Cell Broadcast Service) service specific.
- 10 14. A method of claim 1-6, characterized in that said message is a discrete indication message.
 - 15. A method for indicating requirements for point-to-multipoint service reception in a wireless system to be performed by a terminal operable in said system, characterized in that said method comprises the step of
- -informing terminal's capabilities to said system in order to enable the system to deduce on the basis of the informed data whether the terminal is capable of receiving the service or not (804).
 - 16. A method of claim 15, characterized in that it further comprises a step (806) wherein the system either accepts or rejects the terminal's join request based on said deduction.
 - 17. A method of claim 15, **characterized** in that said system is substantially GSM (Global System for Mobile communication)/GPRS (General Packet Radio Service) or UMTS (Universal Mobile Telecommunications System) system.
- 18. A method of claim 15, characterized in that said informing is performed over a radio access network that is substantially GERAN (GSM/EDGE Radio Access Network) or UTRAN (UMTS Terrestrial Radio Access Network).
 - 19. A method of claim 15, characterized in that said informed data indicates at least one of the following features supported by said terminal: time slot configuration, modulation type, bit rate, capability class.

- 20. A method of claim 15-16, characterized in that it further comprises a step wherein the service-related data is transmitted in conformity with indicated requirements (810).
- 21. A method of claim 16-20, characterized in that said point-to-multipoint service is MBMS (Multimedia Broadcast/Multicast Service).
 - 22. A method of claim 16-20, characterized in that said point-to-multipoint service is substantially a multicast service.
- 23. A method of claim 16-20, characterized in that the air interface in said system is substantially in accordance with DVB (Digital Video Broadcasting) or WLAN (Wireless Local Area Network) specifications.
 - 24. A terminal (900) operable (904, 906, 914, 915) in a wireless system, comprising processing means (908) and memory means (910) for processing and storing instructions and data, **characterized** in that said terminal is arranged to receive a message indicating requirements for point-to-multipoint service reception and further arranged to determine on the basis of said requirements whether it is capable of receiving the service or not.
 - 25. A terminal of claim 24, characterized in that it is arranged to specify said requirements indicated in said message by associating at least one identifier included in said message to a certain set of requirements.
- 26. A terminal of claim 24, **characterized** in that it is arranged to extract said requirements directly from said message wherein said requirements are described explicitly.
 - 27. A terminal of claim 24, characterized in that said message to be received is a point-to-multipoint message.
- 25 28. A terminal of claim 24, characterized in that it is substantially a GSM (Global System for Mobile communication) or UMTS (Universal Mobile Telecommunications System) terminal.
 - 29. A terminal of claim 24, characterized in that it is arranged to extract said indications of service requirements from a schedule message.

- A terminal of claim 24, characterized in that it is arranged to extract at least one of the following parameters defining said requirements from said message: time slot configuration, modulation type, bit rate, capability class.
- 31. A terminal of claim 24, characterized in that it is arranged to receive said message from the system over the air interface congruent with DVB (Digital Video Broadcasting) or WLAN (Wireless Local Area Network) specifications.
 - 32. A terminal (900) operable (904, 906, 914, 915) in a wireless system, comprising processing means (908) and memory means (910) for processing and storing instructions and data, **characterized** in that it is arranged to inform its capabilities to said system for the examination of fulfilment of point-to-multipoint service reception requirements.
 - 33. A terminal of claim 32, characterized in that said informing is to be included in a join request for a multicast service.
- 34. A terminal of claim 32, characterized in that it is substantially a GSM (Global System for Mobile communication) or UMTS (Universal Mobile Telecommunications System) terminal.
 - 35. A network element (918) operable (920) in a wireless system, comprising processing means (923) and memory means (921) for processing and storing instructions and data, **characterized** in that it is arranged to send a message indicating requirements for point-to-multipoint service reception to be delivered to at least one wireless terminal within the service range in order to allow said wireless terminal to determine whether it is capable of receiving the service or not.
 - 36. A network element of claim 35, characterized in that said message to be sent is a point-to-multipoint message.
- 25 37. A network element of claim 35, characterized in that it is arranged to define said requirements for receiving said point-to-multipoint service.
 - 38. A network element of claim 35, characterized in that it is arranged to receive said requirements for point-to-multipoint service reception prior indicating them.

- 39. A network element of claim 35, characterized in that it is arranged to insert said indication of requirements into said message by at least one identifier associated to a certain set of requirements.
- 40. A network element of claim 35, characterized in that it is arranged to insert said indication of requirements into said message explicitly by at least one parameter.
 - 41. A network element of claim 35, characterized in that said it is arranged to operate in a GSM (Global System for Mobile communication)/GPRS (General Packet Radio Service) or UMTS (Universal Mobile Telecommunications System) system.
 - 42. A network element of claim 35, characterized in that it is arranged to transmit said message to be delivered over radio access network.
 - 43. A network element of claim 42, characterized in that said radio access network is GERAN (GSM/EDGE Radio Access Network) or UTRAN (UMTS Terrestrial Radio Access Network).
 - 44. A network element of claim 35, characterized in that it is substantially the CBC (Cell Broadcast Centre).
 - 45. A network element of claim 35, characterized in that said message to be sent is substantially a schedule message.
- 20 46. A network element of claim 35, characterized in that said message to be sent is a discrete indication message.
 - 47. A network element of claim 35, characterized in that said message to be sent includes at least one of the following requirements: time slot configuration, modulation type, bit rate, capability class.
- 48. A network element of claim 35, characterized in that said point-to-multipoint service is MBMS (Multimedia Broadcast/Multicast Service).
 - 49. A network element of claim 35, characterized in that said point-to-multipoint service is substantially a broadcast or multicast service.

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- 50. A network element of claim 35, **characterized** in that the air interface in said system is substantially in accordance with DVB (Digital Video Broadcasting) or WLAN (Wireless Local Area Network) specifications.
- 51. A network element (918) operable (920) in a wireless system, comprising processing means (923) and memory means (921) for processing and storing instructions and data, **characterized** in that it is arranged to receive a notification from a terminal and deduce on the basis of said notification whether the terminal is capable of receiving a point-to-multipoint service or not.
- 52. A network element of claim 51, **characterized** in that it is arranged to accept or reject the terminal's join request based on said decision.
 - 53. A network element of claim 51, characterized in that said point-to-multipoint service is MBMS (Multimedia Broadcast/Multicast Service).
 - 54. A network element of claim 51, characterized in that said point-to-multipoint service is substantially a multicast service.
- 15 55. A network element of claim 51, characterized in that the air interface in said system is substantially in accordance with DVB (Digital Video Broadcasting) or WLAN (Wireless Local Area Network) specifications.
- 56. A system comprising a network element (918) and at least one wireless terminal (900) operable in said system, characterized in that said network element (918) comprises means (920) for sending a message indicating requirements for point-to-multipoint service reception to be delivered to at least said wireless terminal (900) within the service range and said terminal (900) comprises means (906, 914, 915, 910) for receiving said broadcast message indicating requirements for point-to-multipoint service reception and means (908) for determining on the basis of said requirements whether it is capable of receiving the service or not.
 - 57. A system of claim 56, characterized in that said message to be sent is a point-to-multipoint message.
- 58. A system of claim 56, characterized in that said network element (918) further comprises means (923) for defining said requirements for point-to-multipoint service reception.

59. A system of claim 56, **characterized** in that said network element (918) further comprises means (920) for receiving said requirements for point-to-multipoint service reception prior sending said message indicating said requirements.